Quick test of the release APR21 for muon reconstruction

Anna Senger

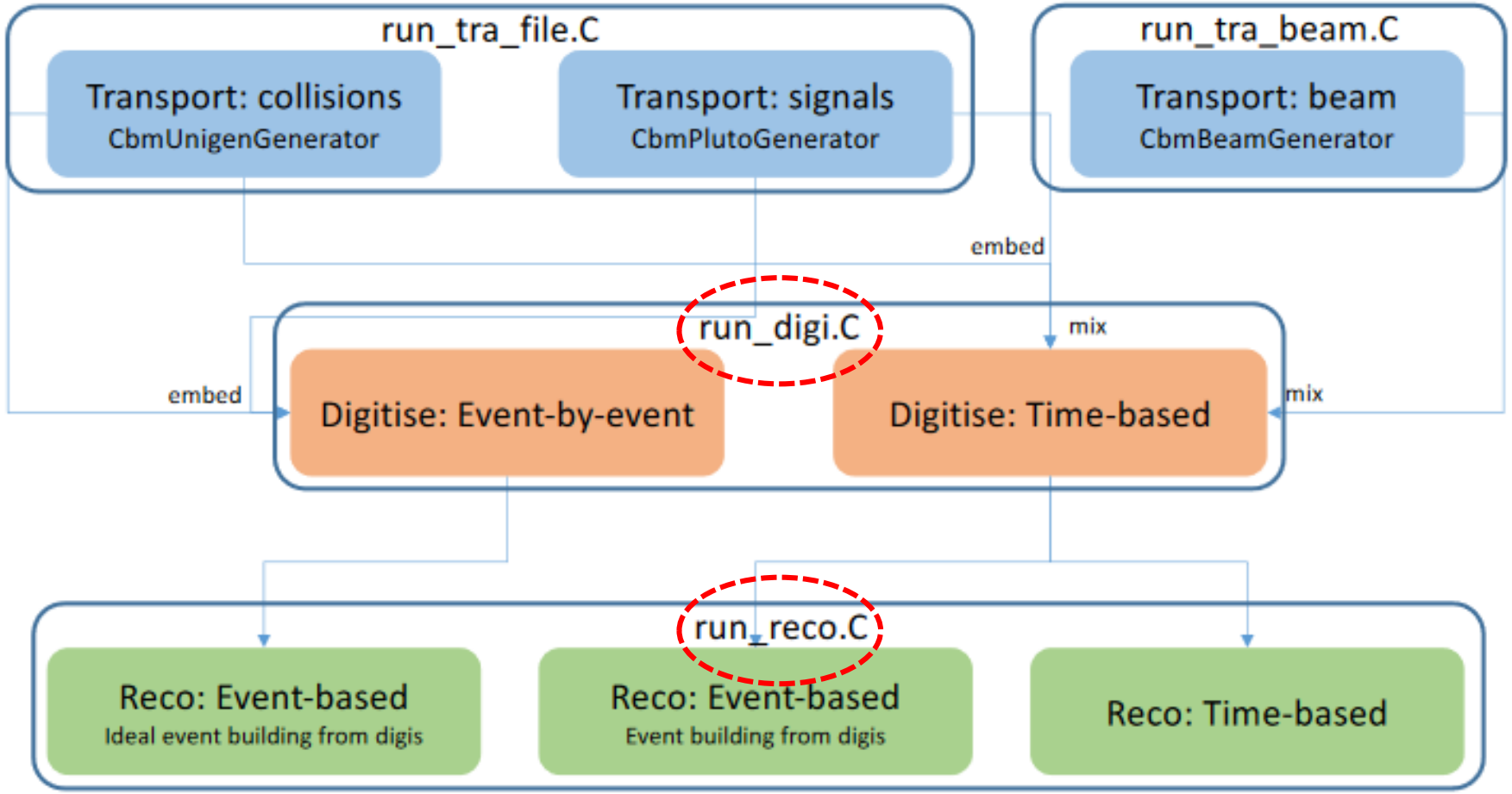
Geometries

	APR20	APR21
magnet	v18b	v20b
beam pipe	v20a_1m	v20a_1m
STS	v19a	v19a
MUCH	v20a_sis100_1m_lmvm	v20a_sis100_1m_lmvm
TRD	v17n_1m	v20b_1m
TOF	v16d_1m	v20b_1m

Macros

Transport: macro/much/run_transport.C
Analysis: macro/much/run_ana.C

Volker Friese
CBM Software Meeting 6 May 2021



Macro inputs for event-based method (macro/run/)

run_digi(TString inputEvents = „muons", Int_t nEvents = 1000,
TString output = „muons", Double_t eventRate = -1, Double_t tsLength = -1.,
TString inputSignal = "", TString inputBeam = "", Double_t beamRate = -1)

run_reco(TString input = „muons", Int_t nTimeSlices = 1000, Int_t firstTimeSlice = 0,
TString output = „muons", TString sEvBuildRaw = „Ideal",
TString setup = "sis100_muon_lmvm", TString paramFile = „muons",
Bool_t useMC = true)

First important comment: in run_reco.C the matching procedure for reconstructed tracks is not included. If one uses MC PID of the reconstructed tracks (STS or global), one has to include the second matching procedure after track reconstruction procedure in run_reco.C

New implementation of the event-based data

Second important comment: now the event-based reconstruction is a special (ideal) case of the time-based reconstruction. The time slices with 1 MC event will be produced after run_digi.C and run_reco.C

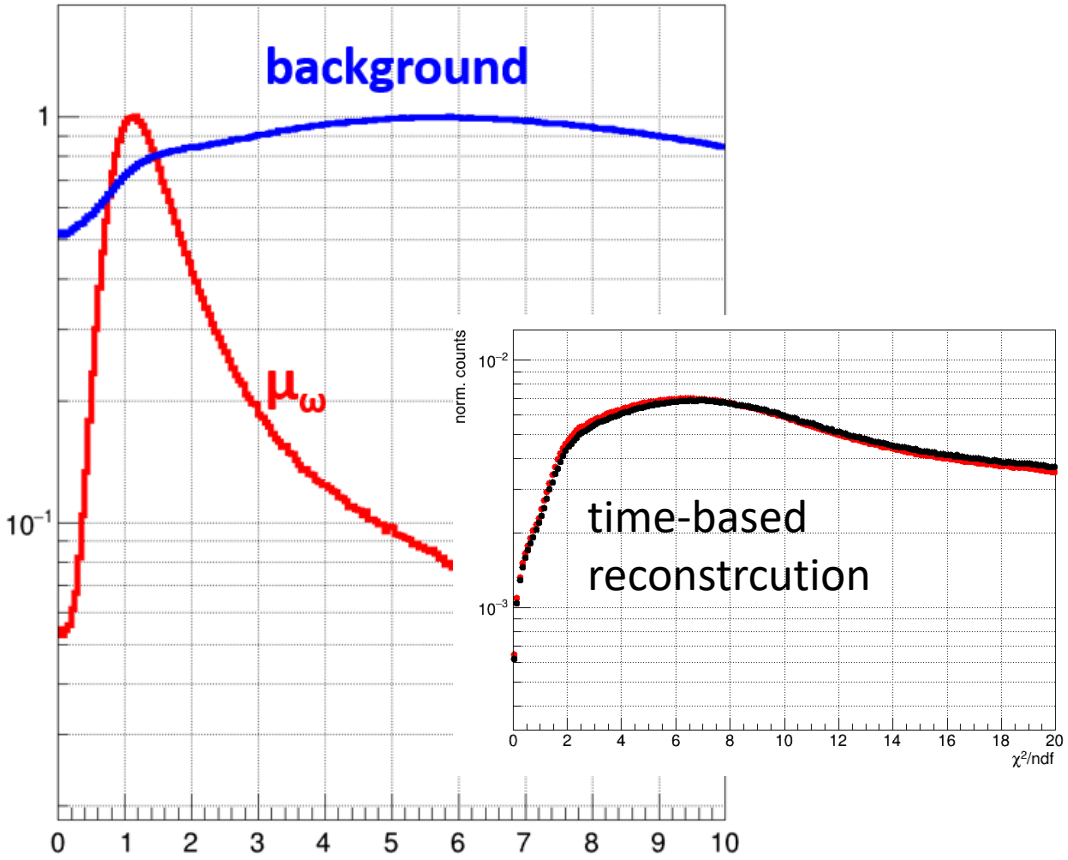
Advantage: possibility to have the same procedures for different methods; simple to test time-based software inside such ideal time slice etc.

Disadvantage: if the software is different for event-based and time-based method, the event-based reconstruction could be time-like and could be not comparable with previous reconstruction event-based results.

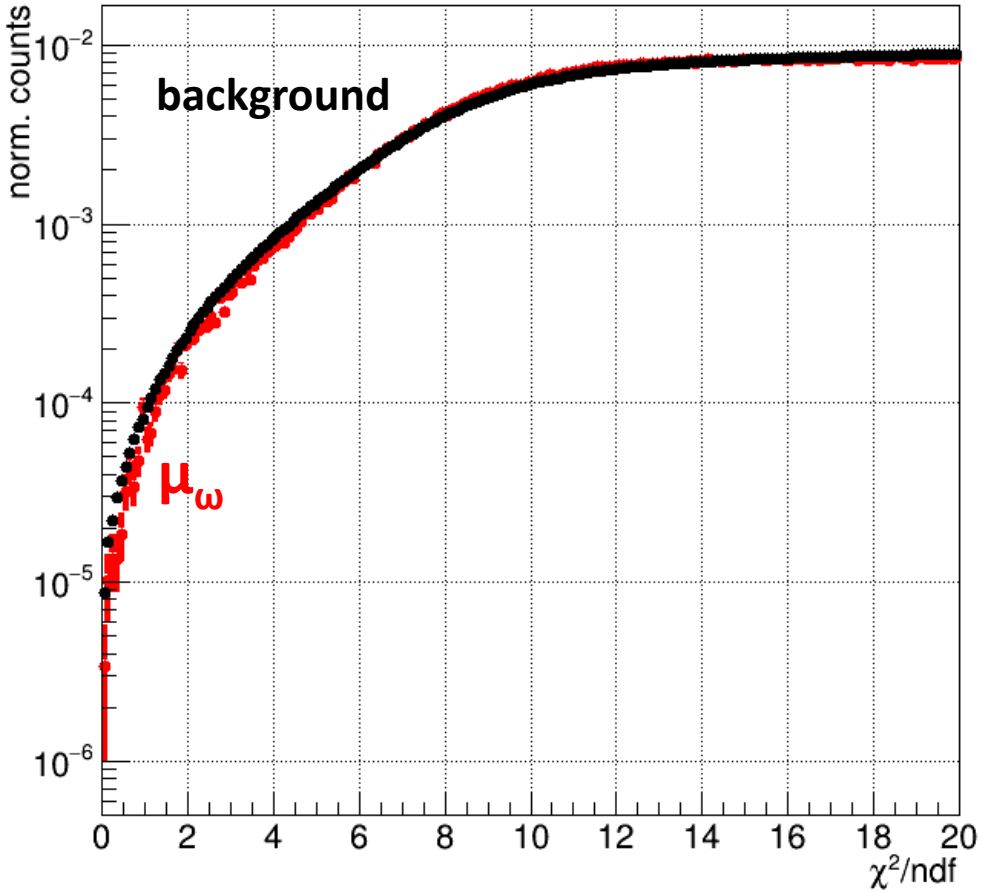
Check the parameters of the global tracks: χ^2_{MUCH}/ndf

ω→μμ + central UrQMD @ 8 AGeV/c

APR20



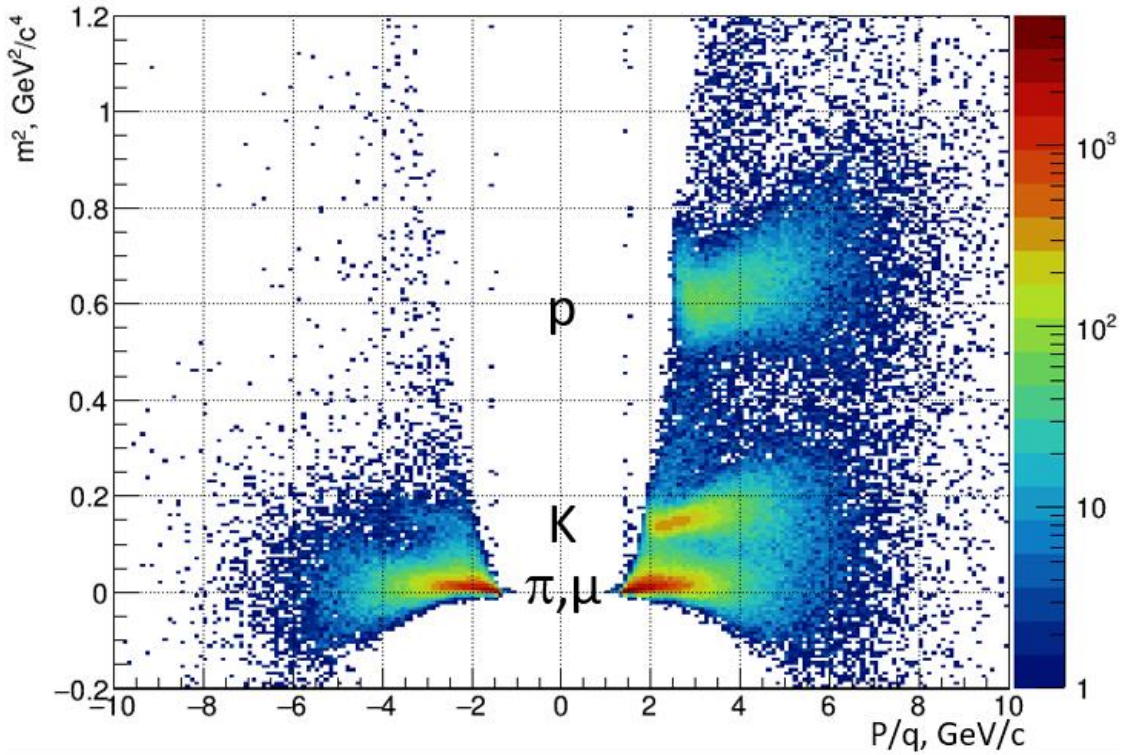
APR21



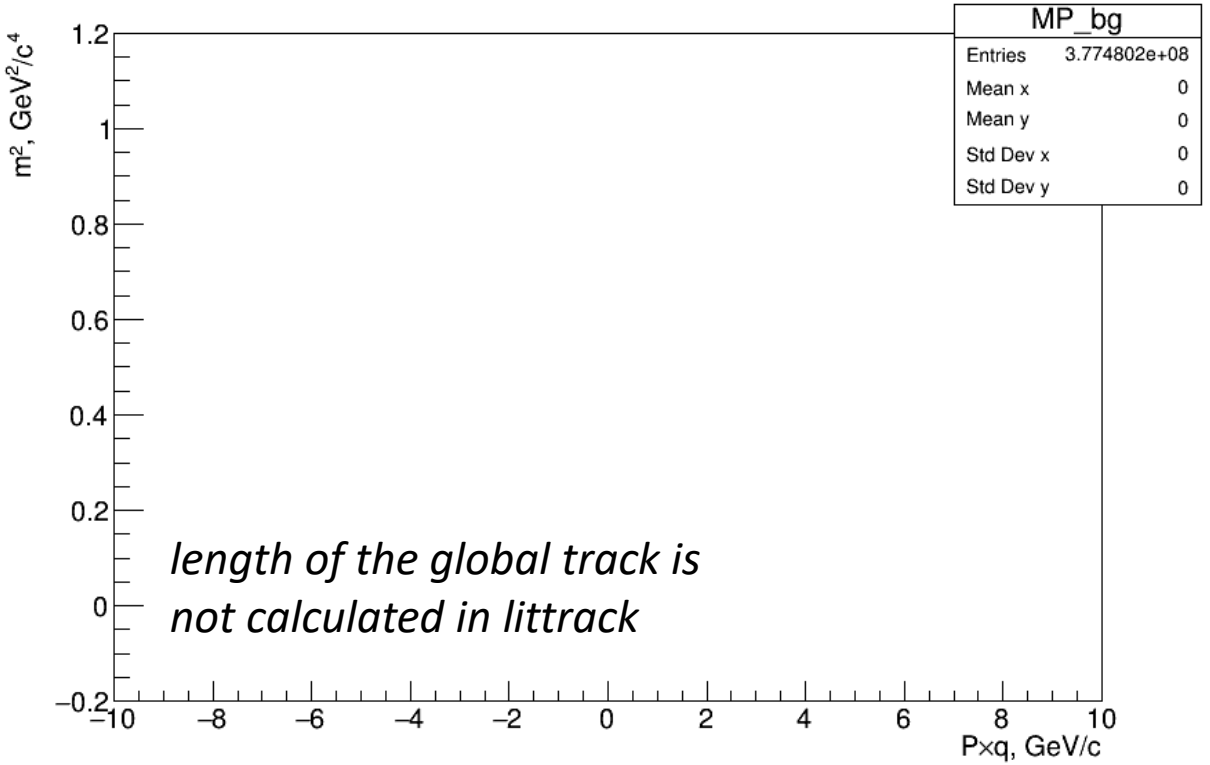
Check the parameters of the global tracks: $m^2(P)$

ω→μμ + central UrQMD @ 8 AGeV/c

APR20



APR21

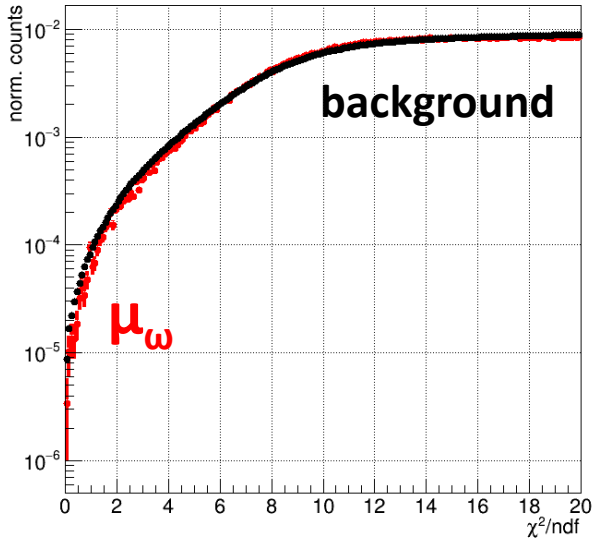


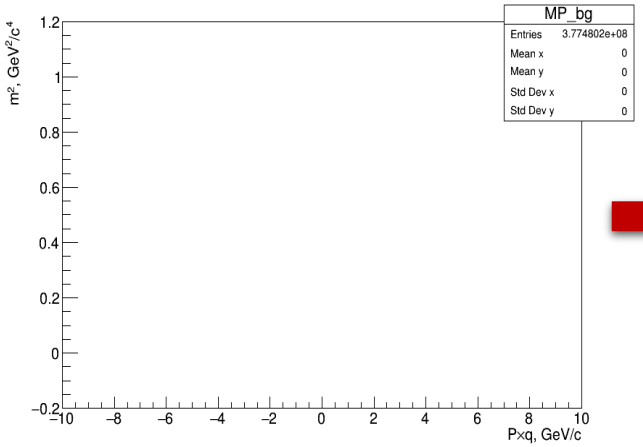
Global tracking

<u>Third important comment:</u> global tracking (littracking) has different procedures for event-based and time-based methods. With the new implementation of the event-based data the muon reconstruction in the event-based method is not possible.

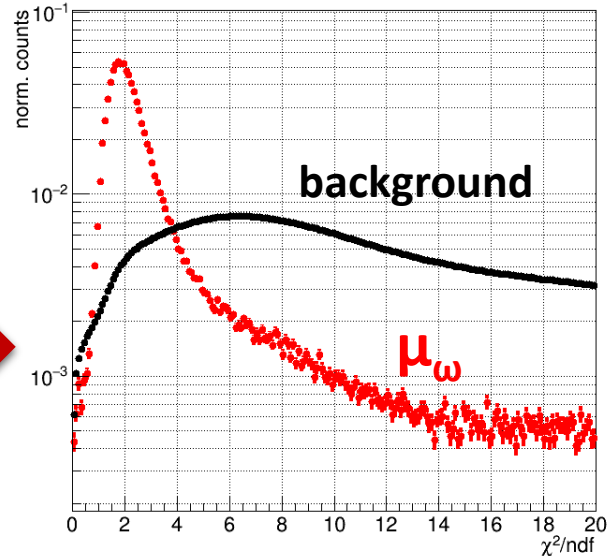
Solution: to use old macro macro/run/run_reco_event.C

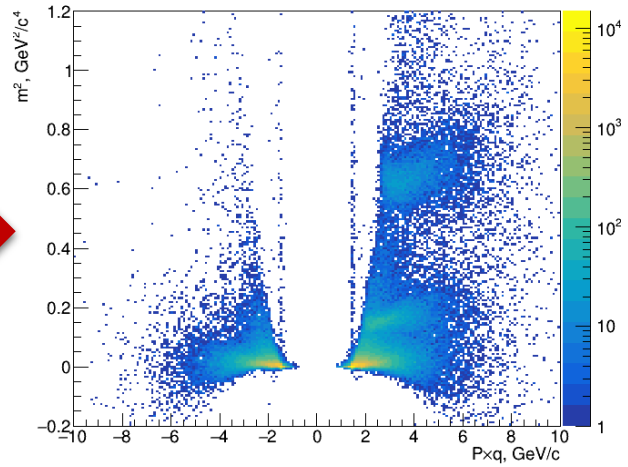
APR21
with run_reco.C

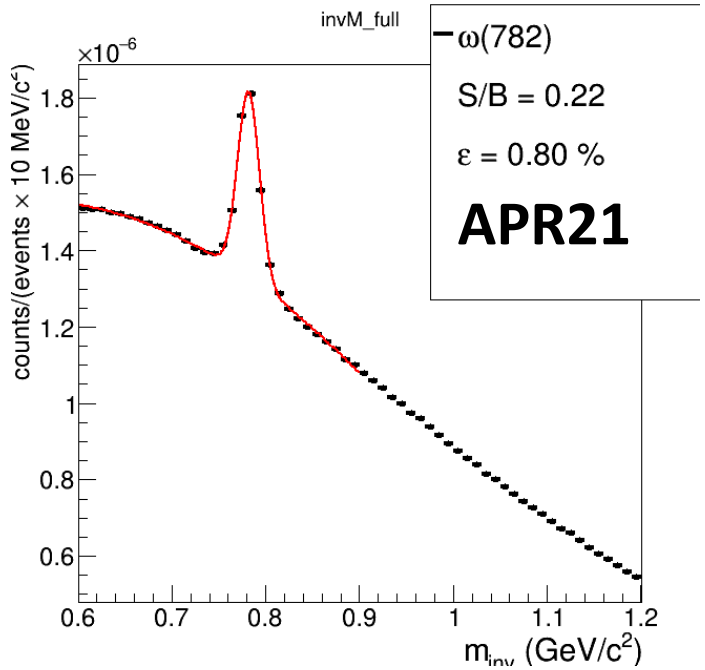


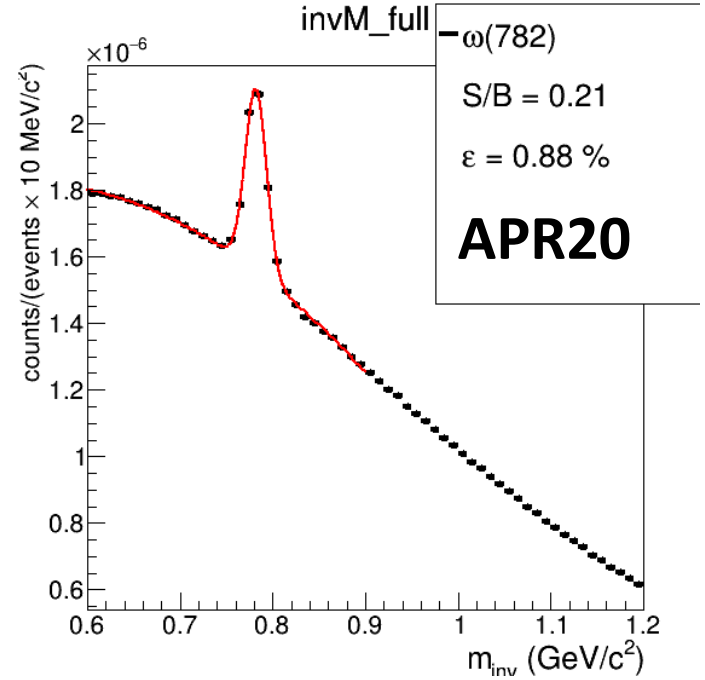


APR21
with run_reco_event.C









Conclusions for muons

- Quick test of the release APR21 detects dependences of the global tracking on the type of the reconstruction method (event or time). Hence is it not possible to use the new implementation of the event-based data for muon reconstruction.
- Until this issue is not solved, the muon reconstruction can be performed with old style macro macro/run/run_reco_event.C.
- The dimuon invariant mass spectrum using the APR20 release is almost reproduced by the spectrum using APR21.